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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/729,664

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EXAMINER

KRASNIC, BERNARD

ART UNIT

PAPER NUMBER

2624

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/729,664	Applicant(s) BHATTACHARJYA, ANOOP K.	
	Examiner Bernard Krasnic	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>5-11-2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claims 1, 3, 8, 10, 14, and 16 are objected to because of the following informalities:

Claim 1, line 5, claims 8 and 14, line 6 respectively: "representation of initial first color" should be -- representation of the initial first color --.

Claims 1 and 14, lines 11-12 respectively: "designated pixel each block" should be -- designated pixel in each block --.

Claims 3 and 16, lines 1-2 respectively: "performed until a reconstructed" should be -- performed until the reconstructed --.

Claim 10, line 4: "after a reconstructed first" should be -- after the reconstructed first --.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

2. Claims 14-20 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 14-20 are drawn to functional descriptive material NOT claimed as residing on a computer readable medium. MPEP 2106.IV.B.1(a) (Functional Descriptive Material) states:

"Data structures not claimed as embodied in a computer-readable medium are descriptive material per se and are not statutory because they are not capable of causing functional change in the computer."

Art Unit: 2624

"Such claimed data structures do not define any structural or functional interrelationships between the data structure and other claimed aspects of the invention which permit the data structure's functionality to be realized."

Claims 14-20, while defining a "machine-readable medium having a program of instructions for directing a machine", does not define a "computer-readable medium" and is thus non-statutory for that reasons. A "machine-readable medium having a program of instructions for directing a machine" can range from paper on which the program is written, to a program simply contemplated and memorized by a person. The examiner suggests amending the claim to embody the program on "computer-readable medium" in order to make the claim statutory. "A machine-readable medium having a program of instructions for directing a machine to process compressed, noisy digital images, the program of instructions comprising" in claim 14 should be -- A computer-readable medium encoded with computer-readable instructions for causing the computer to process compressed, noisy digital images, the instructions comprising --. "The machine-readable medium" in claims 15-20 respectively should be -- The computer-readable medium --.

"In contrast, a claimed computer-readable medium encoded with the data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized, and is thus statutory."
- MPEP 2106.IV.B.1(a)

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

Art Unit: 2624

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-4, 7-10, 13-17, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daly (US 6,411,740 B1) in view of Parulski et al (US 5,189,511).

Re Claim 1: Daly discloses a method for processing compressed, noisy digital images, comprising the steps of (a) processing initial first color data / initial color image of an image to obtain reconstructed first color data / improved perceived color image (see Fig. 4, col. 3, lines 1-5, col. 1, 10-16, col. 5, lines 57-67, col. 6, lines 1-38, col. 2, lines 45-50) image thereof by (a)(1) computing a transform / wavelet transform or DCT (22) representation of initial first color data for each of a plurality of blocks (24) of the image, each computed transform representation comprising a plurality of transform coefficients (see Fig. 4, col. 3, lines 1-5, col. 1, 10-16, col. 5, lines 57-67, col. 6, lines 1-38), (a)(2) thresholding / sigmoid (26, as disclosed by the Applicant in the specification, the soft thresholding may be a sigmoid threshold) and scaling (28, a quantization scales the coefficients) the transform coefficients in each block (see Fig. 4, col. 3, lines 1-5, col. 1, 10-16, col. 5, lines 57-67, col. 6, lines 1-38), and (a)(3) inverting / Inverse Wavelet or IDCT (38) the thresholded and scaled transform coefficients in each block to determine a reconstructed first color value / improved perceived color image for a designated pixel each block (see Fig. 4, col. 3, lines 1-5, col. 1, 10-16, col. 5, lines 57-67, col. 6, lines 1-38).

However Daly fails to disclose or fairly suggest determining spatially local maps between at least a portion of the initial first color data and at least corresponding portions of each of initial second and third color data of the image and estimating

reconstructed second and third color values from selected reconstructed first color values obtained in step using the maps determined.

Parulski discloses determining spatially local maps / interpolation relationship between at least a portion of the initial first color data / green and at least corresponding portions of each of initial second / red and third / blue color data of the image; and (c) estimating reconstructed second / red and third / blue color values for the designated pixel in each block from selected reconstructed first color values obtained in step (a) using the maps determined in step (b) to obtain reconstructed second and third color data of the image (see col. 10, lines 61-65, Parulski teaches that only the green color component is edge enhanced or sharpened which is essentially what steps a, a1, a2, and a3 accomplish, and using the enhanced green and interpolation means determines the red and blue reconstructed data).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Daly's method using Parulski's teachings by limiting the transform, thresholding, scaling, and inverse transforming the entire RGB color space to only the green component in order to provide high processing speed while keeping the improvement of the perceived visual image by sharpening enhancement (see Parulski, col. 10, lines 61-69, col. 11, lines 1-4).

Re Claim 2: Daly further discloses wherein each of the plurality of blocks (24) encompasses a neighborhood of pixels, each block having a respective designated pixel for which the reconstructed first color value is determined (see Fig. 4, col. 3, lines

Art Unit: 2624

1-5, col. 1, 10-16, col. 5, lines 57-67, col. 6, lines 1-38, each pixel of the different frequency content or frequency band images are referred to as coefficients of the transform and each coefficient describes frequency content of a specific designated pixel).

Re Claim 3: Parulski further discloses processing step (a) is performed until a reconstructed first color value / green has been determined for each pixel in a particular neighborhood before proceeding to steps (b) and (c) in which reconstructed second and third color values are estimated (Parulski as discussed in claim 1 above discloses that the second or red and third or blue color values are estimated or determined after the green color component is sharpened through interpolation, the sharpening being performed essentially in step a) for the corresponding designated pixel from the reconstructed first color values in that neighborhood.

Re Claim 4: Parulski further discloses the first color data is green color data, the second color data is red color data, and the third color data is blue color data (see col. 10, lines 61-65).

Re Claim 7: Daly further discloses the thresholding in step (a)(2) is soft-thresholding / sigmoid (26, as disclosed by the Applicant in the specification, the soft thresholding may be a sigmoid threshold).

Art Unit: 2624

As to claims 14-17 and 20, the claims are the corresponding machine or computer readable medium for storing a program claims to claims 1-4 and 7 respectively. The discussions are addressed with regard to claims 1-4 and 7.

As to claims 8-10, the claims are the corresponding apparatus claims to claims 1-3 respectively. The discussions are addressed with regard to claims 1-3.

Re Claim 13: Parulski further discloses the apparatus comprises a computer / signal processing unit or printer / hard copy printer (see col. 4, lines 7-13).

5. Claims 5-6, 11-12, and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daly as modified by Parulski and in further view of Wetchler et al (US 6,196,663 B1). The teachings of Daly as modified by Parulski have been discussed above.

However, as recited in claim 5, Daly as modified by Parulski fails to disclose or fairly suggest the step of performing a hue shift on the reconstructed green, red and blue color data.

Wetchler discloses the step of performing a hue shift on the reconstructed green, red and blue color data (see col. 8, lines 21-32).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Daly's method, as modified by Parulski, using Wetchler's teachings by including the step of performing the hue shift before

Art Unit: 2624

printing the colored image using Parulski's printer in order to provide the ability to print using the CMYK values and provide a color balance (see Wetchler, col. 8, lines 21-32).

As to claim 18, the claim is the corresponding machine or computer readable medium for storing a program claim to claim 5 respectively. The discussions are addressed with regard to claim 5.

As to claim 11, the claim is the corresponding apparatus claim to claims 4-5 respectively. The discussions are addressed with regard to claims 4-5.

However, as recited in claim 6, Daly as modified by Parulski fails to disclose or fairly suggest the step of interpolating the reconstructed image data to a different resolution.

Wetchler discloses the step of interpolating the reconstructed image data to a different resolution / improved resolution (see col. 8, lines 21-32).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Daly's method, as modified by Parulski, using Wetchler's teachings by including the step of performing an interpolating to a different resolution before printing the colored image using Parulski's printer in order to provide the ability to print an improved resolution and provide a color balance (see Wetchler, col. 8, lines 21-32).

As to claim 19, the claim is the corresponding machine or computer readable medium for storing a program claim to claim 6 respectively. The discussions are addressed with regard to claim 6.

As to claim 12, the claim is the corresponding apparatus claim to claim 6 respectively. The discussions are addressed with regard to claim 6.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Elliot et al discloses methods and systems for sub-pixel rendering with adaptive filtering; Nguyen discloses a system and method for asymmetrically demosaicing raw data images using color discontinuity equalization; Chen et al discloses an adaptive transform coding of still images; Shimizu discloses an image reproducing apparatus; Elliott et al discloses methods and systems for sub-pixel rendering with adaptive filtering.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard Krasnic whose telephone number is (571) 270-1357. The examiner can normally be reached on Mon-Thur 8:00am-4:00pm and every other Friday 8:00am-3:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2624

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Bernard Krasnic
April 18, 2007

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